Annals of the Royal College of Surgeons of England (1990) *vol.* 72, 347–349

Typhoid ileal perforations: a retrospective study

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Key words: Typhoid fever; Ileal perforations

This report examines the characteristics of 124 patients with typhoid ileal perforation treated over a 17-year period ending in 1986. Three adverse prognostic determinants were identified: prolonged fever/perforation interval, prolonged perforation/operation interval and multiple perforations. Simple closure was performed in 74 patients with a mortality of 31.1%, and trimming of the ulcer with closure in 38 patients with a 7.9% mortality.

Typhoid fever continues to be a major problem in the tropics. Ileal perforation is a dreaded complication of this disease. The treatment of typhoid ileal perforation has been controversial since the late 1890s. The purposes of this study are to review our experience in the treatment of this disease over nearly two decades, to define prognostic determinants and to compare the relative effectiveness of two common surgical procedures, namely simple closure and trimming with closure.

Materials and methods

The available hospital records of all patients admitted to the department of general surgery with typhoid ileal perforation during a 17-year period ending in 1986 were studied. It includes: 1, patients with typical antimesenteric ileal perforation preceded by a febrile illness, and 2, cases of proven typhoid fever developing signs of perforation while on treatment. Two patients who were discharged on request against medical advice and three patients who had been operated upon elsewhere for typhoid ileal perforation and referred to us for complications were excluded from the study. Only patients over 12 years of age are included in this report. There were 124 patients in the study. Information retrieved from the charts was entered on a standard proforma and data analysis was performed using SPSS11 in a Hinditron SN-23 computer. The χ^2 test was used to determine the statistical significance of the three prognostic indicators, and to compare simple closure with trimming and closure.

Patients with proven typhoid had either positive cultures (from blood or peritoneal fluid) or positive Widal reaction defined as either 'H' or 'O' titre above 1 in 160 or both titres above 1 in 80.

Results

The youngest of our patients was 13 years old and the oldest was 65 years; 60.5% of our patients were in the second and third decades of life. There were 106 males and 18 females. There was proof of typhoid in 48% of cases. The Widal reaction was more often positive than cultures, presumably due to prior antibiotic therapy. Pneumoperitoneum was demonstrated in 44 of 62 patients in whom abdominal X-rays were taken (71%).

Table I. Fever/perforation interval and mortality

Days	*No. of cases*	*% of total*	*Mortality %*
1–14	92	74.2	22.8*
15 and above	18	14.5	38.9*
Not known	14	11.3	50.0

* Difference not statistically significant

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Table II. Peritoneal fluid culture

Total number of patients	91
Culture negative	5
Culture positive	86
Organisms identified	
E. coli	74
Klebsiella	28
Proteus	16
Clostridia	13
Salmonella	5
Bacteroides	1
Enterococci	41
Diphtheroids	4
Others	15

Table 1 shows the time interval between the onset of fever and the occurrence of perforations in relation to mortality. The details of peritoneal fluid culture are summarised in Table II. *Salmonella* was isolated in only five patients, whereas gut commensals were cultured in most patients.

The time interval between the perforation and surgical intervention could be determined in 109 patients. The mortality in the 53 patients who were operated on within 48 h after perforation was 18.9% and in the 56 who were operated on after 48 h was 32.1%. This difference was not statistically significant.

There were multiple perforations in 19 patients compared with 100 patients who had a single perforation. The mortality in the former group was 52.6% and in the latter group it was 19.0%. This difference in the mortality is statistically significant ($P<0.01$).

Simple closure and trimming of the perforation with closure were the two commonly performed operations, in 74 and 38 cases, respectively. Three patients underwent simple drainage of the peritoneal cavity and two moribund patients were managed conservatively, all of whom died. Five patients underwent resection and primary anastomosis with a mortality of 60%. One patient had right hemicolectomy and another had simple closure with ileotransverse anastomosis, and both survived. There was a 31% mortality in the 74 patients who underwent simple closure and a 7.9% mortality in the patients who had trimming of the perforation with closure. This difference is statistically significant ($P<0.01$).

The prognostic determinants in the patients who underwent trimming and closure were compared with those in patients treated by simple closure. There was no significant difference in mean age, admission haemoglobin, percentage with positive peritoneal fluid culture, fever/perforation interval of more than 14 days or perforation/operation interval of more than 48 h. However, the trimming with closure group contained a significantly higher percentage of patients with multiple perforations (21.1% compared to 8.1%; $P<0.05$).

Table III shows the overall mortality and the type of surgical procedure carried out at different times during the study period. It is evident that the mortality declined considerably between 1983 and 1986 when the bulk of patients were treated by trimming and closure.

Table III. Comparison of mortality and type of operation during study periods

Period	Total No. of cases	No. of cases: Simple closure	No. of cases: Trimming with closure	Overall mortality, %
1970–74	30	27	0	31.0
1975–78	20	18	1	40.0
1979–82	40	25	11	27.5
1983–86	34	4	26	8.8

Discussion

The treatment of typhoid ileal perforation has been controversial since the late 1800s *(1)*. In our hospital it has been the practice to operate on all patients. The optimal surgical procedure has also been a matter of dispute *(1)*. In the absence of a randomised controlled trial comparing different surgical procedures, we feel that this retrospective study will be useful in offering guidelines for treatment and delineating areas that need further study.

We have found typhoid ileal perforation in both sexes and in all age groups. As in other studies, we found it to be more common in men during the 2nd and 3rd decades *(2–8)*. The reason for this male preponderance is not known although it is possible that men have an increased risk of exposure to typhoid fever *(9)*.

In our study, perforation occurred early in the course of the disease and this has been recognised by others *(2,3,5,9,10,11)*. Patients who perforate during the first 2 weeks of the illness appear to have a better prognosis *(3,12–14)*. For this difference in mortality to be significant, a much larger number of patients would need to be studied. Compromised nutritional status could possibly play a role in the poor prognosis of the patient who has been ill for more than 2 weeks and then develops a perforation *(15)*, but this theory is unproved.

Proof of typhoid was found in less than 50% of patients compared with 95% by Eggleston and Santoshi *(16)*. The peritoneal fluid was sterile in only 5 of 91 patients. *Salmonella* was isolated in only five patients *(1,17–19)*, most of the others growing a wide variety of gut commensals. This underlines the fact that antibiotic therapy should cover *Salmonella* and gut commensals *(20)*.

In our study there appears to be a trend towards better prognosis in the patients who underwent operation soon after they perforated *(9,10,12,14,21–24)*. We also noted that although few patients had more than one perforation *(6,24,25)* this group did poorly *(11)*. Our observations contradict Archampong's view that multiple perforations do not adversely affect prognosis *(14)*.

Bitar and Tarpley *(1)* in their excellent review, have pointed out that the ideal operation for typhoid perforation should be simple yet effective. We have gradually

moved away from simple closure of the perforation to trimming of the perforation with closure. In the latter operation, the margin of the perforation is trimmed by 3–4 mm so that healthier tissues are coapted by the sutures. Other options, such as ileostomy tube drainage *(26,27)*, wedge resection *(2)*, resection and anastomosis *(6,28)*, and ileotransverse anastomosis *(16,27,29,30)* have not found favour with us.

The mortality from typhoid ileal perforation has improved dramatically during the course of the study period. It is tempting to postulate that the improvement in the mortality is due to the change from simple closure to trimming of the ulcer with closure. Within the limitations of a retrospective study we have tried to compare determinants in these two patient populations and have found the first five of them to be similar in the two groups. We have observed earlier that multiple perforations carry a poor prognosis. The percentage of patients with multiple perforations, however, is significantly higher in the group where trimming with closure was done, yet this operation carried a significantly lower mortality. However, these two operations have been carried out during two different time spans, and the reason for the improvement in the mortality should be interpreted with care in the light of the declining mortality for typhoid in our institution. The influence of factors such as improvement in fluid management and new antibiotics (especially those against anaerobic infections) have been difficult to quantitate in this retrospective study.

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Received 8 March 1990